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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/727,393	12/04/2003	Ivan Lalovic	H1542	7537
45305	7590	12/21/2005	EXAMINER	
RENNER, OTTO, BOISSELLE & SKLAR, LLP (AMDS) 1621 EUCLID AVE - 19TH FLOOR CLEVELAND, OH 44115-2191			AKANBI, ISIAKA O	
			ART UNIT	PAPER NUMBER
			2877	

DATE MAILED: 12/21/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/727,393

Applicant(s)

LALOVIC ET AL.

Examiner

Isiaka O. Akanbi

Art Unit

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 04 December 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-20 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 04 December 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|----------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date <u>24 March 2004</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Information Disclosure Statement

The information disclosure statement file 24 March 2004 has been entered and reference considered by the examiner.

Drawings

The examiner approves the drawings filed 4 December 2003.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 1-2, 4-10, 14-19 and 20 are rejected under 35 U.S.C. 102(e) as being anticipated by Naulleau (6,927,887 B2). The reference of Naulleau discloses the features of the claimed as follows:

As regard to claim 1, Naulleau discloses a device for determining reflection lens pupil transmission distribution in a photolithographic reflective imaging system comprising of the following:

- an illumination source (12);
 - a reticle supporting a reflective mask layer having a plurality of light-reflecting areas and non-reflective areas thereon (70);
 - a diffuser (10) mounted with respect to the reflective mask layer (10);
 - a lens system (fig. 1) comprising one or more reflective elements (11/18/60/62); and
 - an image plane (64),
- wherein a pupil image corresponding to one or more the plurality of light-reflecting areas in the reflective mask layer is formed at or near the image plane when light from the illumination

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source passes through the diffuser to the reflective mask layer, reflects from the light-reflecting areas and passes through the lens system, the pupil image having a reflection lens pupil transmission distribution (fig.1)(col.7, line 41-46).

As to claims 2 and 12, according to claim 1 and 11, Naulleau discloses wherein the wherein the diffuser (10) eliminates or substantially alters contributions of the illumination source aperture uniformity from the reflection lens pupil transmission distribution (col. 3, line 36-47).

As to claims 4, 19 and 20, Naulleau discloses wherein the diffuser at least partially homogenizes or randomizes one or more of intensity, spatial intensity distribution, phase, coherence and propagation direction of light passing therethrough (col. 5, line 40-49).

As to claim 5, Naulleau discloses wherein the diffuser is a random phase plate (col. 5, line 40-49).

As to claims 6 and 17, according to claim 1 and 11, Naulleau discloses wherein the diffuser is configured to be oscillated during operation of the device (fig. 2)(col. 5, line 3-7).

As to claim 7, Naulleau discloses wherein the reflective mask layer is formed on a surface of the reticle (70)(fig. 1)(col. 7, line 4-5).

As to claim 8, Naulleau discloses wherein the diffuser is removably mounted with respect to the reflective mask layer (fig. 1 and fig. 2).

As to claims 9 and 10, Naulleau discloses wherein the image plane is substantially coplanar with a focal plane of light from the lens system and the reflective mask layer is offset from a focal plane of light from the illumination source (fig. 1).

As to claim 14, Naulleau discloses wherein use of the diffuser decouples contributions to the second pupil image arising from the illumination source aperture uniformity from contributions rising from the lens system (col. 3, line 36-47).

As to claim 15, Naulleau discloses wherein the first pupil intensity distribution substantially corresponds to combined effects of illumination source (12) intensity distribution and lens system (14/16) pupil transmission distribution (fig. 1)(col. 4, line 65-col. 5, line 1-3).

As to claim 16, Naulleau discloses wherein the second pupil intensity distribution substantially corresponds to lens (14/16/10/11/18/60/62) system pupil distribution (fig.1).

18. A device for determining both illumination source aperture uniformity and reflection lens pupil transmission distribution in a photolithographic reflective imaging system, the device comprising:

an illumination source (12);

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a reticle supporting a reflective mask layer having a plurality of light-reflecting areas and non-reflecting areas thereon (70);

a diffuser (10) removably mounted with respect to the reflective mask layer (fig. 1)(fig. 2);

a lens system comprising one or more reflective elements (60/62); and

an image plane (64),

wherein a first pupil image corresponding to one or more of the plurality of light-reflective areas in the reflective mask layer is formed at or near the image plane when the diffuser is removed and light from the illumination source reflects from the light-reflecting areas and passes through the lens system, the first pupil image having a first pupil intensity distribution $P_{(x,y) \text{ no diffuser}}$; and wherein a second pupil image corresponding to one or more of the plurality of light-reflective areas in the reflective mask layer (70) is formed at or near the image plane when the diffuser (10) is mounted and light from the illumination source (12) passes through the diffuser, reflects from the light-reflecting areas and passes through the lens system, the second pupil image having a second pupil intensity distribution $P_{(x,y) \text{ diffuser}}$, and wherein the following relationships are defined (fig.1)(fig. 2)(col. 7, line 41-46):

$$P_{(x,y) \text{ diffuser}} = P_{(x,y) \text{ reflective lens}} \quad (1)$$

and

$$P_{(x,y) \text{ diffuser}} / P_{(x,y) \text{ no diffuser}} = P_{(x,y) \text{ illumination source}} \quad (2).$$

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 3, 11 and 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Naulleau (6,927,887 B2) in view of the following remarks.

As to claims 11, Naulleau discloses a method for determining reflection lens pupil transmission distribution and illumination source aperture uniformity in a photolithographic imaging system comprising an illumination source (12), a reticle supporting a reflective mask layer having a plurality of light-reflecting areas and non-reflecting areas thereon (70), a lens system comprising one or more reflective elements (60/62), measuring first pupil intensity distribution of one or more first pupil image at an image plane (64), the one or more first pupil image formed by light reflected by corresponding ones of the plurality of light-reflecting areas while passing light from the illumination source to the reflective mask layer (70) and through the lens system, mounting a diffuser (10) with respect to the reflective mask layer; measuring second pupil intensity distribution of one or more second pupil image at the image plane, the one or more second pupil image formed by light reflected by corresponding ones of the plurality of light-reflecting areas while passing light from the illumination source (12), to the diffuser (10), to the reflective mask layer (70) and through the lens system (fig. 1)(col. 7, line 41-46). The reference of Naulleau is silent regarding intensity measuring device for comparing the first and the second pupil intensity distributions to determine intensity distribution of radiation emanating from the illumination source and the lens system. It would have been obvious to one having ordinary skill in the art at the time of invention to incorporate a photodetector/intensity measuring device for the purpose of comparing the intensity of the light measured at the two distances to determine the distortion of the reflective surface.

As to claims 3 and 13, according to claims 1 and 11 above, Naulleau discloses the claimed invention except for is silent regarding wherein the light-reflecting areas or the non-reflecting areas in the reflective mask layer have a substantially same predetermined size and shape and are spaced apart from one another so that overlap between the pupil images at the image plane is avoided while measuring intensity and/or uniformity of the pupil images is enabled, however the applicant discloses (fig. 1)(Page 12, line 20-Page 13, line 1-2) that this is a well known. Therefore It would have been obvious to one having ordinary skill in the art at the time of invention to incorporate the teachings of Naulleau in conjunction with applicant indication of feature to design/provide light-reflecting areas or the non-reflecting areas in the reflective mask layer to meet the terms of the claims, since the use of the features will produce equally/same effect. (see In Ex parte McGaughey, 6 USPQ2d 1334, 1337 (Bd. Pat. App. & Int.1988).

Additional Prior Art

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. The references listed in the attached form PTO-892 teach of other prior art method and device for determining reflection lens pupil transmission distribution in a photolithographic reflective imaging system that may anticipate or obviate the claims of the applicant's invention.

Conclusion

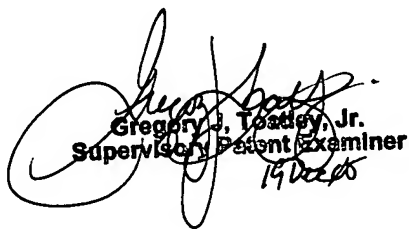
Fax/Telephone Information

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Isiaka Akanbi whose telephone number is (571) 272-8658. The examiner can normally be reached on 8:00 a.m. - 4:30 p.m.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Gregory J. Toatley Jr. can be reached on (571) 272-2800 ext. 77. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Isiaka Akanbi
December 10, 2005


Gregory J. Toatley, Jr.
Supervisory Patent Examiner
14 Dec 05